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Interorganizational Effectiveness,
Efficiency and Network Structure

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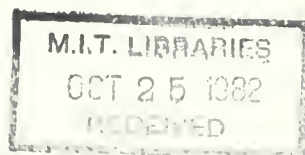
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by

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## INTRODUCTION

Interorganizational relationships have been recognized as an important influence on the character and level of an organization's performance (Yuchtman & Seashore, 1967; Perrow, 1979, Chapter 6; Evan, 1972; Pennings, 1981). But differences in the effectiveness of interorganizational ties moderate this influence; more effective relationships should lead to better results for the organizations involved and be more likely to persist over time (Van de Ven and Ferry, 1980, p. 317). Why are some interorganizational relations seen as successful by the parties involved and others not? This question guides the research we present here.

Our model for determining relational effectiveness combines two frameworks: transaction cost analysis (Williamson, 1975; Ouchi, 1980), and the ecological structure of the interorganizational community. These frameworks are linked through the concept of efficiency and through the analytical construct of an interorganizational network (Knoke and Rogers, 1978; Evan & Walker, 1978). In essence, relationships are perceived as more effective when they are more efficient, and the efficiency of relationships is determined by their location in the network.

Defining the criteria for selecting the organizations involved in a relational study is an important research step (Aldrich, 1979, p. 284). In the present study we are concerned with the relationships between 45 non-profit organizations located in a medium-sized city in the Northeastern United States. The agencies were chosen because they were involved with problems of the mentally ill and mentally retarded in the city. The second author constructed the list on the basis of his knowledge as a regional administrator of mental health and retardation programs.

The study is organized in four parts. The first part presents the theory relating perceived effectiveness, transaction costs and interorganizational networks. The methods of the research are described in part two. The results are presented in part three and discussed in part four.

THEORY

## Transaction Costs

Williamson defines a transaction as "the transferral of a good or service across a technologically separable interface" (1981, p.. 552). The analysis of transaction costs involves assessing how well different kinds of transactions are governed. Costs associated with a governance structure are related to the effort required to establish perceptions of equity in the parties involved (Ouchi, 1980). An efficient transaction is one that is governed with least possible cost.

Empirical studies of transaction costs have typically been carried out in the private sector (Williamson 1976; Teece 1980). However, Williamson's definition of a transaction does not characterize adequately the relationships between non-profit organizations, such as those studied here. In addition to exchanging goods and services, non-profit firms frequently enter into planning arrangements (Warren, Rose and Bergunder, 1974; Litwak and Hylton, 1962), which are generally forbidden to private-sector firms. Furthermore, transaction costs between non-profit firms are difficult to assess because the economic measures by which alternative governance structures can be compared (see Williamson & Ouchi, 1980, p. 35) are vague. The framework of transaction cost analysis must be modified, therefore, before it can be applied to non-profit interorganizational relations.

Interorganizational relationships are conceived here as multiplex (Mitchell, 1973; Aldrich and Whetten, 1981). That is, two organizations may be related in a number of different ways simultaneously. We dimensionalize interorganizational relationships into evaluative, motivational and governance components. The evaluative dimension is perceived effectiveness, which is what we attempt to explain. The motivational component consists of the

reasons for the relationship, and the dimensions of a relationship's structure and process define its governance characteristics.

Dimensionalizing transactions is a central theoretical task in transaction cost analysis (Williamson and Ouchi, 1980, p. 4). Evaluation (as the judgement of equity) and governance are prevalent components in transaction cost research, but relationships have rarely, if ever, been classified in this tradition according to the different reasons underlying them. We argue that for non-profit agencies, relationships established for different sets of reasons require different governance mechanisms. In private sector studies, the transaction dimensions -- investment specificity, transaction uniqueness, complexity, and uncertainty -- perform the same function (see Ouchi and Barney, 1981) as reasons in our approach. These dimensions are related to the problems of transaction valuation. We assume that in the absence of a competitive price-governed market, this problem is endemic to all relationships in the non-profit sector and is therefore subordinate to a second problem, goal achievement. We emphasize purpose, rather than valuation, as the issue agencies address in assessing the effectiveness of an interorganizational relationship.

Williamson states that "efficiency is realized only if governance structures are tailored to the specific needs of each type of transaction" (1981, p. 568). We define efficiency, then, as the congruence between the purposes for which a relationship is established and maintained and the governance characteristics of the relationship which facilitate the achievement of those purposes. But what does "congruence" mean in this context? The problem here involves:

1)  choosing an appropriate method for measuring how the reasons for a relationship are matched to the way it is governed, and

2)  deciding what determines an efficient match.

The first part of this problem will be dealt with in the methods section to follow. The second part is addressed now.

Since we have no clear and reliable external measure of transaction cost, we rely on an approximation. We define the efficient match between the reasons and governance characteristics of an interorganizational relationship as the population trend. The average choice in a population of managerial decisions has been found to approximate optimality in a number of contexts (Bowman, 1963). Following this research, Pfeffer (1972) defined the optimal percentage of inside and outside board directors within firms as the industry average.

Our population consists of interorganizational relationships, and we assume that the most efficient relationships are composed of motivational and governance aspects whose association conforms to the central tendency of the population. Without an external measure of optimality, we cannot test our assumption directly. However, in transaction cost analysis efficiently governed relationships are supposed to induce perceptions of equity; consequently, we may be able to test the assumption indirectly by defining perceived equity as perceived effectiveness and then looking at how closely our measures of efficiency and effectiveness are related.

## Reasons for Relationship

For the set of organizations studied here we identified seven reasons for relationship. Other researchers have found these reasons to be significant motivations for relationships between human services organizations.

1.  Client Referrals. Clients were judged to be an important type of resource flow in the set of organizations. Client flows were investigated in similar organizational communities by Levine and White (1961), Aiken and Hage (1968), Aldrich (1976), and Van de Ven and Walker (1980).

2. Financial Transactions. Funds flows were also seen as an important
   resource basis for a relationship. Money flows between non-profit
   organizations have been a focus of research for a number of
   investigators, notably: Aiken and Hage (1968), Benson (1975),
   Aldrich (1976), and Galaskiewicz and Marsden (1977).

3. Planning. Van de Ven, Walker and Liston (1979) found that members
   of the human service agencies frequently met for planning
   purposes. We observed the same reason for relationship in the
   organizational community of the present research.

4. Joint Mental Health Programs. A number of interagency
   relationships were partially based on the joint administration of
   programs. Joint ventures between human service organizations have
   been investigated in several studies, particularly, Aiken and Hage
   (1968), Klongan et al. (1976), and Knoke and Rogers (1978).

5. Information Acquisition. Relationships based on the need for
   information have been destinguished from resource dependence ties
   (see Aldrich, 1979, Chap. 5). Information transfer between
   organizations has been studied by Klongan et al. (1976),
   Galaskiewicz and Marsden (1978), and Knoke and Rogers (1978).

6. Mandatory Relationships. Legal requirements governed the
   interactions between a number of agencies in the present research.
   Hall et al. (1977) dimensionalized the basis for an
   interorganizational relationship as voluntary or mandatory.
   Aldrich (1976) and Turk (1973) also make this distinction.

7.  Conflict Resolution.  Attempts to resolve conflict were an
    important basis for interaction between the organizations studied
    here.  In contrast, existing levels of unresolved conflict, have
    generally been investigated in interorganizational studies (e.g.,
    Schmidt and Kochan, 1977).  Conflict resolution can be seen as a
    major motivation for achieving goal consensus, the primary facet of
    the clan governance structure (Ouchi, 1980).

The seven reasons listed above are meant to describe the major
motivations for establishing and maintaining ties among the agencies studied
here.  Client and funds flows were measured both from and to organizations,
increasing the number of reasons to nine in all.  Joint program management and
mandatory relationships might be seen in other contexts as governance rather
than motivating characteristics, in that they represent past decisions for the
administration of interagency transactions.  However, we combine these
characteristics with current client and financial transaction requirements,
and with current administrative efforts, e.g., planning, in a single category
covering all reasons for agency interaction.  We will assess the associations
between these reasons when we construct measures of relational efficiency.

## Governance Characteristics

Because of their generally non-economic character, relationships between
non-profit organizations are not governed by markets based on prices; nor,
because of the administrative autonomy of agencies, are their relationships
coordinated by forms of internal organization[1].  How, then, are these types
of relationships managed?

Two alternative market-like governance mechanisms are proposed by Ouchi
and Barney (1981).  These mechanisms are clan-assisted and bureaucratically
assisted markets, and each relies on a different type of information to govern

transactions. Clan-assisted markets rely on norms and values, and bureaucratically assisted markets depend on rules and regulations. Ouchi and Barney state:

> Intermediate external governance forms such as clan and bureaucratically assisted markets arise when simple market prices fail. The key difference between these two governance mechanisms lies in the extent to which market prices are augmented by subtle, informal relations based on mutual trust and closeness, on the one hand, and rules, arbitration, and third party authorities on the other. The isolation of these intermediate external forms of governance helps to resolve one of the most ambiguous boundary definitional problems in organizational theory, that of defining boundaries between cooperative organizations. The classic example of such interorganizational cooperation is Selznick's (1949) description of the Tennesse Valley Authority. The present conceptualization recognizes such cooperation as a form of intermediate external governance. Moreover, rather than suggesting that such forms are inefficient or anomalous, the conception presented here argues that under some circumstances, they may be efficient (pp. 25-26).

Ouchi and Barney do not make clear how the market mechanisms they describe are distinct from characteristics of the governed relationships. We argue that behavioral governance characteristics should be viewed as components of relationships between organizations on the grounds that the detail of dyadic exchange is sufficient to capture the effects of auxiliary support and guidance systems (see Williamson, 1981, p. 570). Thus, in the present study governance structures are specifically endogenous to relationships.

To what aspects of a relationship can we assign a governance function? For Ouchi and Barney, a range of both formal and informal characteristics serve this purpose. In our framework, for efficient governance to be achieved, such characteristics should be related to the reasons for a relationship. Research on interorganizational coordination (Hall et al 1977; Van de Ven, Walker and Liston, 1979) has shown that a broad array of characteristics are associated, in combination with different reasons, with high levels of coordination. This result is consistent with our approach to defining efficiency[2]. We draw then on research on interorganizational

coordination, which has typically been studied among non-profit organizations, to specify the components of governance mechanisms.

Since we emphasize the coordination as well as the control of interorganizational relationships, our governance characteristics include, in addition to the manipulable elements of interorganizational policy, components of a relationship that cannot be manipulated directly by agencies and yet facilitate achieving transaction purposes. We chose five governance characteristics because of their general relevance for governing interorganizational relationships motivated by the seven reasons listed above.

1.  Perceived Resource Dependence. The perception of resource dependence has been an important component of research on interorganizational coordination (Van de Ven and Ferry, 1980, Chapter 8). Where resource flows such as clients and funds are concerned, resource dependence may appear to be redundant as a governance characteristic; however, Van de Ven and Walker (1980) have shown that clients and funds flows are related in different degrees to perceptions of dependence. Furthermore, the role of perceived dependence in facilitating planning and joint programs (Aiken and Hage, 1968) may be different from its association with resource flows.[3]

2.  Formalization. Formalization of been an important aspect of governance structures in the transaction cost literature. Formalization, as it is treated here, is not broken into the different types of contract discussed by Williamson (1975, Chapter 3). Rather, a contractual relation is seen as a simple condition which facilitates the accomplishment of some purposes but not others. For example, formalized ties between organizations have been associated with flows of money but not flows of clients (Van de Ven and Walker, 1980).

3.  Communications.  The frequency of communications between
    organizations may indirectly facilitate certain types of resource
    flow (Van de Ven and Walker, 1980).  Also, Hall et al (1977) found
    that the degree with which frequency of contact affected the level
    of interorganizational coordination varied according to the reason
    for the relationship.  Strong communications between organizations
    therefore may lead to efficient transactions in some circumstances
    but not in others.

4.  Domain Similarity.  Van de Ven and Walker (1980) found that
    organizations which perceived their domains as similar tended to
    have fewer funds flows at a later time.  Domain dissimilarity may
    therefore be a facilitating factor in establishing financial
    transactions (see also Molnar and Rogers, 1979).

5.  Goal Congruence.  Ouchi (1980) discusses the importance of goal
    congruence as a component of the clan governance structure.[4]
    Also both Evan (1966) and Guetzkow (1966) propose that goal
    compatibility is a condition for frequent interaction between
    organizations.

Resource dependence was measured both from and to other organizations.
Interagency similarity of both client and service domains was assessed, and
two modes of communication, telephone and written, were measured.
Consequently, altogether eight governance characteristics were matched to the
reasons motivating the interagency relationships.

With the reasons for relationship and governance characteristics
identified and a framework for measuring their congruence proposed, we now
state our first hypothesis:

1.  The greater the congruence between the reasons for relationship and
    the governance characteristics of a relationship, assessed by the
    population trend, the greater should be the perceived effectiveness
    of the relationship.

## TRANSACTION EFFICIENCY AND THE INTERORGANIZATIONAL NETWORK

In the preceding section we assumed that efficiency could be measured by focusing only on a relationship and ignoring its environment. Now we turn to the environment and define it as the network of relationships connecting the 45 organizations. We argue that the network location of a relationship determines its level of efficiency.

Burt (1980b) distinguishes between the "positional" and "relational" approaches to network models. In the positional approach the interactions within the entire organizational community are analysed simultaneously rather than sequentially. The network location of a relationship is thus determined by how all relationships are configured rather than by which others are the relationship's nearest neighbors.

Below we outline three ways of tying the positional analysis of an interorganizational network to the distribution of efficient relationships. First, we interpret positional analyses using the biological metaphor of a community ecology (Levins, 1968, Chapter 3; Hazen, 1975). Then, we relate network structure to the concept of opportunity structures (Lauman, Galaskiewicz, and Marsden, 1978). Last, the distribution of relationships is linked to the pattern of functional differentation in the set of organizations.

### The Community Ecology[5]

Organizations in a network can be described, in ecological terms, simultaneously as both resource sites or habitats and as species. Positional analyses specify the way organizations in the community use each other as a resource environment. The pattern of the network may contain substructures in which subsets of users and suppliers are closely related to each other.

Partitioning a set of organizations acting as an environment into roughly homogeneous subsets is analogus to partitioning resources, used by

biological species, into ecological niches (Schoener, 1974, p. 27). Thus Vandermeer (1972) defines the problem of clustering habitats into niches as one of comparing habitats in terms of the way particular species use them.

Correspondingly, niche identification also involves comparing species in terms of their use of the environment. Competition between species is typically represented in a community matrix. Levins describes the coefficients in the community matrix as "similar to a regression coefficient of one species' use of the environment on that of another" (1968, p. 51).

Clustering species by the correlations of their environmental use and, alternatively, clustering habitats by the way they are used parallels closely the type of positional network analysis employed by Van de Ven, Walker, and Liston (1979) on a community of organizations. Thus, a positional analysis of an interorganizational network into intersecting subsets of organizations is analogous to deriving the locations of ecological niches in community ecology (see especially Lambert and Williams, 1962).

There are two major differences, however, between niche definition in a network of non-profit organizations and the theory combining biological species and resource sites. First, unlike the members of a biological community, organizations in a network are assumed to constitute a single trophic level. Because interorganizational ties can be both symbiotic and commensalistic (Aldrich, 1979, p. 266; Pennings, 1981), and because relations are inherently multiplex , there is no fixed asymmetry of energy flow between organizations. The user community and the resource environment thus have the same members. Second, the elements in the community-environment matrix of organizations are interorganizational relationships whereas in ecological research the matrix contains counts of species members.

High member counts in a niche indicate fitness; that is, controlling for selection processes and the processes of population equilibrium, a niche favors a species the greater number of that species inhabit it (see Levins, 1968, p. 40). Translating from counts of biological species to the incidence of interorganizational relationships, we define fitness as relational efficiency.

## Opportunity Structures

The substructures produced by a positional analysis of an interorganizational network also resemble opportunity structures. Laumann and his colleagues (1978) suggest that opportunity structures may play an important role in the way interorganizational transactions are accomplished. In particular, organizations may face greater difficulties in their relations outside their immediate set of partners than inside the set. Thus, relationships within a given opportunity structure may be easier to govern than those outside it.

## Functional Differentiation

In addition, the structure of closely related subsets of interdependent organizations may describe a pattern of functional differentiation in the network. By partitioning separately the user community and resource environment of an interorganizational network, Van de Ven, Walker and Liston (1979) found that three dense clusters of relationships could be identified. Each cluster was associated with a different reason for relationship. Furthermore, the clusters differed significantly in the way relationships were coordinated. The profiles of the clusters on coordination characteristics tended to match the reason with which each cluster was labelled. Thus the analysis of the interorganizational network produced a pattern of subsets of

interactions, where each subset was distinct in terms of the predominant reason for relationship and matching mode of coordination.

As niches, opportunity structures, or functionally unique regions, dense substructures of the interorganizational network should contain a high number of efficient relationships. The second hypothesis of the present study is then:

2. The denser the intersection of subsets of organizations in an interorganizational network, the more efficient should be the relationships between members of the subsets.

## METHODS

### Data

The set of forty-five organizations comprised all the organizations identified as members of the mental health/mental retardation community.  The director of each organization was asked to choose from the list of 45 at most five other agencies with which his or her organization was most directly involved in the past six months.  Of the 225 possible choices among the 45 organizations 221 were made by the agency directors.  The director was then asked to check those of the nine reasons which were the basis for the relationship with each agency chosen.  Two indicators of perceived effectiveness with each relationship - satisfaction with the relationship and the extent to which the relationship was perceived as worthwhile - were measured on five point Likert scales.  Seven of the eight governance characteristics were measured on five point Likert scales, the exception being contractual relations which was a binary variable.  These measures were taken from the interorganizational relations section of Van de Ven and Ferry's Organization Assessment Instrument (see Van de Ven and Ferry, 1980, Chapter 8).  The response rate was 100%.

Two aspects of the data merit discussion.  First, we chose to use directors as key informants and the sole data source within each organization.  Although the reliability of key informants as respondents for organizations has been shown to be low (Phillips, 1980), it increases when the key informant is assumed to be especially knowledgeable about the subject (Phillips, 1980, p. 342).  Directors are assumed here to have the broadest, although perhaps not the deepest, knowledge of their agencies' interorganizational relationships.  Moreover, because the key informants in this study have a uniform status, the implications of the results are relatively consistent for the organizations involved.  For example, directors

occupy the best position to act on their perceptions of interagency effectiveness and so alter or reinforce the locations of their agencies within the organizational community.

Second, we measure interorganizational relationships asymmetrically.[6] That is, each side of a relationship is considered separately (contrast Provan, Beyer and Kruytbosch, 1980; and Van de Ven and Ferry, 1980). We do not compare the effects of dissimilar perceptions of effectiveness in a relationship (compare Schmidt and Kochan, 1977), but rather try to explain why each director is more or less satisfied with the relationships in which his or her agency has engaged. Perceived effectiveness here is a function of subjective experience weighted, as will be seen below, by the experience of the community.

## Measurement of Efficiency

The nine reasons for relationships and eight governance characteristics were factor analysed separately in an exploratory manner using principal components, and components with eigenvalues greater than one (Kaiser's rule, see Harman, 1967, p. 168) were selected for rotation (VARIMAX method). The dimensions produced by the factor analyses were an improvement over the raw data for two reasons. First, the exploratory analysis provided information on the structure of intercorrelations among the variables in each set. This information was used to interpret the results of the hypothesis tests. Second, the reduction of the raw data to independent dimensions greatly facilitated the measurement of congruence between the governance characteristics and reasons for relationship and thereby the computation of efficiency scores for each case.

The measurement of congruence was the next step in the analysis. The method used was canonical correlation. The two sets of variables to be correlated were the reasons dimensions and the dimensions of governance

characteristics produced by the factor analyses, and the analysis was performed on factor scores computed for these dimensions. The output of the technique consisted of unique (i.e., rotationally invariant) and independent pairs of canonical weights. The weights in each pair produced new reasons and governance dimensions which were maximally correlated and whose joint space is analogous to a regression line between two variables. Thus, the canonical weights are similar to regression coefficients.

The methodological arguments for using regression as a technique for measuring congruence have been presented by Dewar and Werbel (1979, pp. 436-437). Like Dewar and Werbel's regression residual measures, pairs of canonical variates are orthogonal. The problems caused by multicollinearity when congruence is used as a predictor are thus eliminated. Also, as Dewar and Werbel point out, a non-criterion based measure of congruence can be related to other variables such as, in the present study, location in the network.

However, two major problems arise in using a regression approach: 1) the inability to assess measurement and specification error; and 2) normative bias in using the population trend as the standard of congruence rather than the trend in the subset of high performing cases. The problems of measurement and specification error cannot be solved using either regression residuals or canonical correlation, but we assume that the normative bias associated with our method is not a drawback. When congruence is intepreted in cost efficiency terms, the use of regression weights is based empirically in the managerial coefficient tradition (Bowman, 1963; Kunreuther, 1969). A pair of canonical variates can be thought of in the present study as composed of efficiency coefficients that weight the reasons and governance dimensions according to the structure of their intercorrelation.[7]

## Network Analysis

The method of analysis used to operationalize network substructures was
blockmodelling (White, Boorman and Breiger, 1976; Arabie, Boorman and Levitt,
1979). Blockmodelling is a "positional" method, in Burt's (1980b)
terminology. The partition of the population into positions is based on the
principle of structural equivalence (Lorrain & White, 1971) which combines
members whose relationships with the rest of the network are similar. In the
present study, two blockmodelling techniques, CONCOR (Breiger, Boorman and
Arabie, 1975) and CALCOPT (Boorman, 1981) were used. We applied the
techniques to the rows and columns of the matrix of relationships separately,
following the distinction between the user community and resource environment
as alternative perspectives on the set of organizations studied. Rows and
columns of the matrix were each partitioned into four subsets using CONCOR,
and these partitions were used as rational starting configurations for
CALCOPT. CALCOPT reassigned the members of the network to different subsets
if the reassignment increased the distance between the densities of ties
connecting the subsets and the mean density of the network itself. In a
sense, CALCOPT makes the blockmodel "leaner" by increasing the densities of
some regions and decreasing the densities of others. We applied CALCOPT to
rows and columns successively until no increase in the target function
occurred.

## Test of the Hypotheses

The hypotheses were tested as a structural equation model using version
IV of LISREL (Joreskog and Sorbom 1982; Bagozzi and Phillips, 1982). We chose
LISREL because it was capable of estimating the coefficients in a system of
structural equations containing both measurement and specification error. If
the observations of the dependent variables are independent and multinormal,
conditional on the independent variables, LISREL produces full-information
maximum likelihood estimates of the structural equation coefficients.

RESULTS

## Measurement of Efficiency

The factor analysis of the reasons for relationship produced four intepretable dimensions which accounted for 62.7% of the variance (see Table 1). The first dimension can be thought of as representing mandatory bases for interaction between pairs of organizations. The second factor represents planning interests. The third and fourth dimension are clearly associated with client and funds flows, respectively.

The reduction of the nine reasons to independent components shows how the reasons were associated with each other. First, both client and funds flows were generally seen as bilateral. Although bilateral referral of clients is understandable, if not appropriate, in this community of agencies, the bilaterial exchange of funds seems to violate the commonly held notion that money flows hierarchically between non-profit organizations. The incidence of bilateral financial transactions may reflect payback arrangements or other forms of reciprocity.

Second, joint mental health programs is highly correlated with both the dimension labelled mandatory reasons and the dimension tied to planning purposes. Because joint programs may reflect or occur with mandated relationships and at the same time motivate or result from planning efforts, this dual association was not eliminated from the analysis.

We can also interpret the results of factor analyzing the governance characteristics (see Table 2). Three dimensions with eigenvalues greater than 1 accounted for 59.5% of the variance. These factors describe three independent types of relationship.

## Table 1

### VARIMAX Rotated Factor Matrix for Reasons

### Motivating an Interorganizational

### Relationship

|  | Reasons | I<br>Mandatory | II<br>Planning | III<br>Clients | IV<br>Funds |
|---|---|---|---|---|---|
| 1. | Acquire Information | .04 | .76 | .12 | -.05 |
| 2. | Refer Clients | -.09 | .08 | .84 | .08 |
| 3. | Receive Clients | .15 | -.17 | .70 | -.21 |
| 4. | Joint Program | .46 | .53 | -.03 | -.29 |
| 5. | Provide Funding | .01 | .12 | .01 | .81 |
| 6. | Obtain Funding | .35 | -.19 | -.24 | .56 |
| 7. | Legal Requirements | .85 | -.01 | -.07 | .04 |
| 8. | Planning | -.03 | .70 | -.27 | .28 |
| 9. | Settle Disagreements | .59 | .15 | .29 | .31 |
|  | Eigenvalue: | 1.81 | 1.51 | 1.31 | 1.01 |
|  | % Variance Explained: | 20.1 | 16.8 | 14.5 | 11.3 |
|  | Cummulative Variance<br>  Explained: | 62.7% |  |  |  |

Underlined coefficients are greater than .4

## Table 2

### VARIMAX Rotated Factor Matrix for Governance

### Characteristics

| Governance Characteristics | I<br>Client<br>Dependence | II<br>Service<br>Contracts | III<br>Goal<br>Congruence |
|---|---|---|---|
| 1. Respondent Depends on Other Agency | .76 | .13 | .02 |
| 2. Formalization of Agreement | .07 | .84 | .29 |
| 3. Service Domain Similarity | .34 | -.51 | .23 |
| 4. Frequency of Written Communication | .65 | -.06 | .20 |
| 5. Frequency of Telephone Communication | .76 | -.11 | -.22 |
| 6. Agreement on Goals | -.12 | -.09 | .87 |
| 7. Other Agency Depends on Respondent | .66 | .31 | -.14 |
| 8. Client Domain Similarity | .67 | -.12 | .17 |
| | | | |
| Eigenvalue: | 2.60 | 1.11 | 1.05 |
| | | | |
| % Variance Explained: | 32.5 | 13.9 | 13.1 |
| | | | |
| Cummulative Variance Explained: | 59.5% | | |

Underlined coefficients are greater than .4

The first dimension was labelled client dependence because both directions of resource dependence (on and from other organizations), both types of communications, and client domain similarity load on it highly. Resource dependence is bilateral just as were client and funds flows. Moreover, because it is associated with client and not service domain similarity, resource dependence should be seen as client based. This intepretation is reinforced by the high correlations of both telephone and written communications with the first dimension, since frequent communications are necessary to monitor client but not money transactions (Van de Ven and Walker, 1981).

Contractual relations and service domain similarity are highly correlated (in opposite directions) with the second factor . Thus, formal contracts are generally formed between organizations which perform different functions in the region. Hall and his colleagues (1977) found a similar pattern of relational characteristics and recognized in it a formalized system of sequential interdependence.

The third component is characterized only by the high loading of agreement on service goals. Thus goal congruence constitutes a dimension that is independent of client dependence and contractual relations.

In summary, four independent dimensions underlay the nine reasons for relationship. These dimensions were labelled mandatory reasons, planning, client referrals and funds flows. Three orthogonal components explained roughly 60% of the variance in the governance characteristics; these components were interpreted as client dependence, service contracts, and goal congruence. The discrimination among these constructs is quite strong. Reducing the reasons and governance characteristics to interpretable, orthogonal dimensions makes the next step in the analysis substantially easier. The goal now is to determine how efficiently reasons and governance characteristics are matched in each relationship.

The canonical correlation analysis between the four types of reasons and the three kinds of governance characteristics produced two significant pairs of canonical variates ($p < .1$) (see Table 3).  Interpreting the first pair is relatively straightforward.  Two reasons dimensions, clients and planning, and one governance dimension, client dependence, have strong positive correlations with the first pair of variates.  Thus, interorganizational ties motivated by client flows and planning are typically supported by a governance mechanism consisting of high client domain similarity, communications, and bilateral perceived resource dependence.  In this community of organizations, interestingly, perceived resource dependence is associated with client rather than funds flows (contrast Van de Ven and Walker, 1981).

Two aspects of the second pair of canonical variates make its interpretation more difficult.  First, both the reasons variate and the governance variate contain high weights with both positive and negative signs.  Second, client flows are positively associated with the second reasons variate as well as the first.  We will deal with these difficulties in turn.

Mandatory and funds flow relationships have negative weights on the second reasons variate, matching the negative weight of contractual relationships on the second governance variate.  In a parallel way the positive correlation of client flows is matched by the positive weight of goal congruence.  Thus, because of the differences in sign, client flows governed by goal congruence have the opposite (hypothesized) influence on effectiveness from money and mandatory relationships governed by contracts.  Which of these combinations of variables increases effectiveness is determined by the test of the hypotheses.

## Table 3

### Canonical Correlation Between Reasons for a

### Relationship and Governance Characteristics

| Reasons for Relationship | First Pair of Canonical Variates | Second Pair of Canonical Variates |
|---|---|---|
| 1. Mandatory | .35 | <u>-.61</u> |
| 2. Planning | <u>.58</u> | -.35 |
| 3. Clients | <u>.74</u> | <u>.51</u> |
| 4. Funds | -.07 | <u>-.49</u> |
| **Governance Characteristics** | | |
| 1. Client Dependence | <u>.89</u> | -.20 |
| 2. Service Contracts | -.38 | <u>-.76</u> |
| 3. Goal Congruence | -.19 | <u>.59</u> |
| Eigenvalue: | .11 | .05 |
| Canonical Correlation | .33 | .21 |
| Wilks Lambda: | .84 | .95 |
| Chi-square: | 36.62 | 11.3 |
| Degrees of Freedom | 12 | 6 |
| Significance | p < .001 | p < .07 |

Underlined coefficients are greater than .4

Client flows relate strongly to both pairs of variates. These relationships may conflict in their contribution to effectiveness. The hypothesis tests show whether this is the case.

## Network Analysis

The density matrix produced by CALCOPT is shown in Table 4. High densities are generally clustered in the upper left or lower right areas of the matrix, indicating a general split in the community between the groups of agencies. The agencies in each group are listed in Figure 1. Note that the partitions of rows and columns are not identical. In general, however, we find direct service agencies located in groups I, II, V or VI, that is, in the upper left portion of the matrix. Also, seven of the ten agencies in groups VII and VIII are found in groups III and IV. These agencies are characterized by primarily (although not exclusively) administrative rather than direct service functions.

Since we focus only on how the densities of interaction between the groups effect relational efficiency, a detailed analysis of the network results is beyond the scope of the present study. Clearly, however, matching characteristics of organizations to their location in the network is one bridge between the alternative perspectives of community and population ecology (see Evan and Walker, 1978).

## Tests of Hypotheses

The hypotheses form the structural equation model shown in Figure 2. The LISREL results for this model are shown in Table 5A. The fit of the model to the data was assessed using the chi-square statistic, the null hypothesis for which is that the model does not fit the data. Since the probability of type I error was .07, the null hypothesis could not be rejected ( $p < .1$ ). We then tested a revised model (see Table 5B), with the non-significant path

## Table 4

### Density Matrix of Interorganizational

### Network

Roman Numerals Denote Groups of Organizations.

Each matrix entry is the density of relationships between a pair of groups.

|      | V     | VI    | VII   | VIII  |
|------|-------|-------|-------|-------|
| I    | .611  | .031  | .167  | .014  |
| II   | .278  | .081  | .042  | .083  |
| III  | .012  | .042  | .393  | .357  |
| IV   | .067  | .086  | .8    | .063  |

## Figure 1

## Memberships of Groups Forming the Partitions

## of the Network Indicated in

## Table 4

### I

Halfway House
Outpatient Clinic
Dow House
Adult Residence
Even House
Jones Home
Mental Health Project
Shelter Workshop

### III

Association for Retarded Children
Health Center
Council on Alcoholism
Dept. of Social Services
Developmental Center
Family Services
Low Order and Justice
LIV Corp
Association for Learning Disabled
Probation Department
Community Action Program
Inner City Ministry
United Way
Adult Education
YWCA

### II

Adult Day Center
Care Club
Mental Health Center
Inpatient Unit
City Mission
County Jail
Mental Health Board
Inpatient Service
Mental Health Regional Office
Police Court
CETA
YMCA

### IV

Family Services
Family and Child Services
Family Court
Planning Council
Hot Line
Office of Aging
Advisory
Salvation Army
Department of Health
Visiting Nurses

Figure 1 (Cont.)

## V

Cara Club
Halfway House
Outpatient Clinic
Health Clinic
Inpatient Service
Shelter Workshop

## VII

Department of Social Services
Office of Aging

## VIII

Association for Retarded Children
Mental Health Board
Developmental Center
Planning Council
Advisory
Police Court
CETA
United Way

## VI

Adult Day Center
Health Center
Mental Health Center
Family Services
Inpatient Unit
City Mission
Council on Alcoholism
County Jail
Dow House
Adult Residence
Even House
Family and Child Services
Family Court
Hot Line
Jones Home
Law Order & Justice
LIV Corp
Association for Learning Disabled
Mental Health Regional Office
Mental Health Project
Probation Department
Salvation Army
Department of Health
Commmunity Action Program
Inner City Ministry
Visiting Nurses Assoc.
Adult Education
YMCA
YWCA

# Figure 2

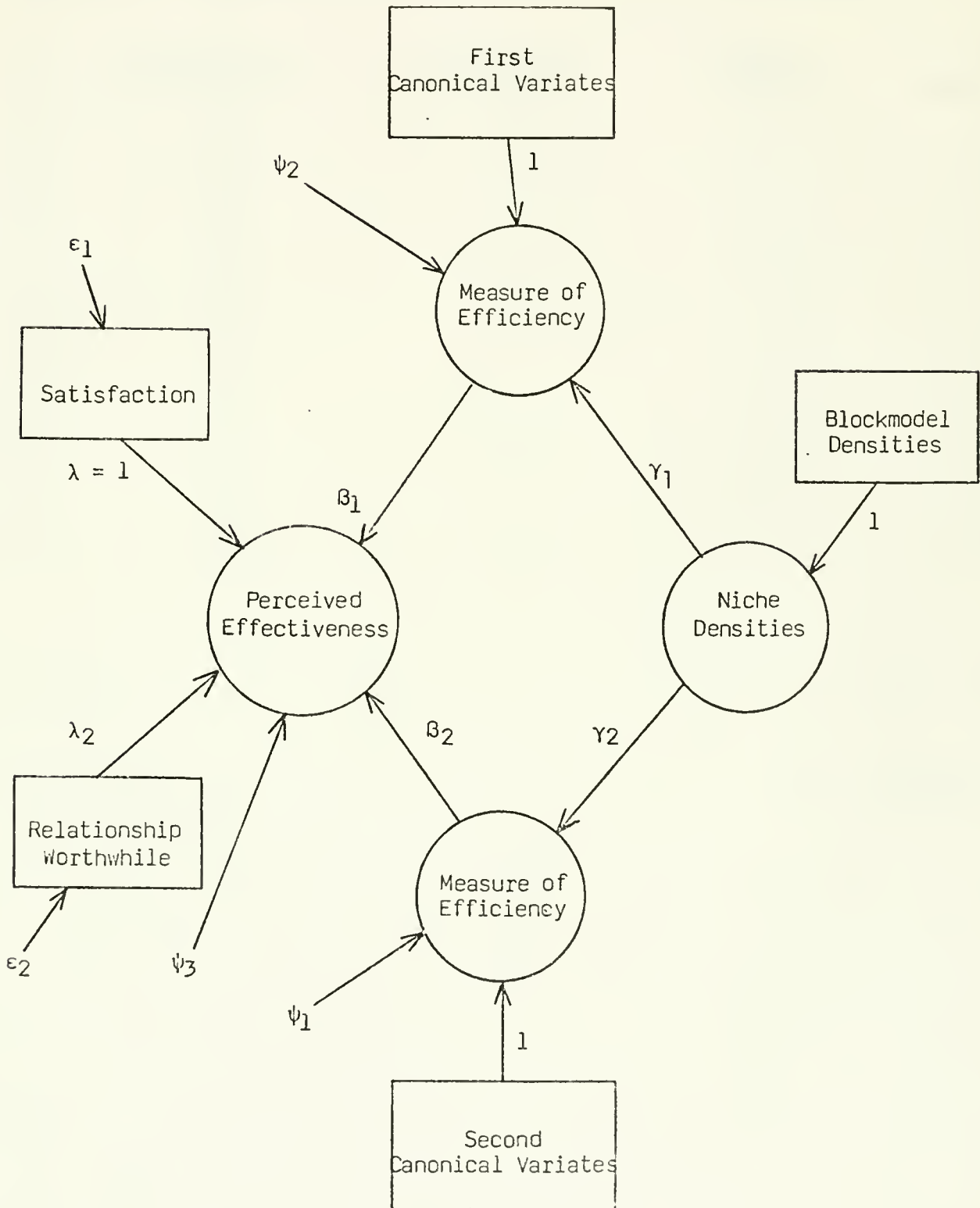## Structural Equation Model Tested Using

## LISREL

## Table 5

A. Estimates of Parameters Specified in Figure 2

|  | Unstandardized Estimate | Standardized Estimate | Standard Error | T Value |
|---|---|---|---|---|
| $\lambda_1$ | 1 | .33 | 0 | 0 |
| $\lambda_2$ | 2.37 | .77 | .9 | 2.63 |
| $\beta_1$ | -.09 | -.49 | .037 | -2.61 |
| $\beta_2$ | .06 | .28 | .027 | 2.17 |
| $\gamma_1$ | 1.68 | .25 | .45 | 3.76 |
| $\gamma_2$ | -.03 | -.01 | .44 | -.07 |
| $\psi_1$ | 2.43 | 1.0 | .23 | 10.49 |
| $\psi_2$ | 2.53 | .94 | .24 | 10.49 |
| $\psi_3$ | .07 | .68 | .04 | 1.78 |
| $\epsilon_1$ | .95 | - | .09 | 9.59 |
| $\epsilon_2$ | .64 | - | .23 | 2.76 |

$\chi^2 - 10.02$   df $- 5$

Probability = .07

## Table 5

B. Estimates of Parameters in Revised Model

|  | Unstandardized Estimate | Standardized Estimate | Standard Error | T Value |
|---|---|---|---|---|
| $\lambda_1$ | 1 | .33 | 0 | 0 |
| $\lambda_2$ | 2.36 | .77 | .9 | 2.63 |
| $\beta_1$ | -.09 | -.49 | .037 | -2.61 |
| $\beta_2$ | .06 | .28 | .027 | 2.17 |
| $\gamma_1$ | 1.68 | .25 | .45 | 3.76 |
| $\psi_2$ | 2.53 | .94 | .24 | 10.49 |
| $\psi_3$ | .07 | .68 | .04 | 1.77 |
| $\varepsilon_1$ | .96 | - | .09 | 9.59 |
| $\varepsilon_2$ | .64 | - | .23 | 2.76 |

$\chi^2 - 10.02 \quad df - 7$

Probability = .18

connecting niche density and the second measure of efficiency removed. The

reduction in chi-square was negligible; but with the increase in degrees of

freedom, the probability of Type I error was .18. Consequently, the null

hypothesis was rejected, and the model can be considered a reasonably good fit

to the data.

An examination of the structural equation coefficients shows first that

the two pairs of canonical variates have significant but opposite effects on

perceived effectiveness. The first efficiency measure has a positive effect

on perceived effectiveness. But the second measure has a negative effect.

Thus, the lower a relationship's value on the second pair of variates, the

higher the effectiveness perceived.

Referring to the weights on the second pair of variates, we see that high

scores on mandatory and money transactions and on the contractual dimension

lead to high effectiveness. We can interpret the second pair of variates

therefore as a type of relational efficiency based on mandatory and funding

reasons which require contractual agreements for their successful

accomplishment. In contrast, high scores for client flows and goal consensus

on the second pair of variates decrease effectiveness.

Organizations with client referrals, consequently, have a problem. The

stronger client flows are, the greater the effectiveness of the relationship,

as determined by the first pair of variates, but the lower the effectiveness

determined by the second pair. In this population of interorganizational

relationships, then, agencies must balance the benefit of increasing client

flows against their costs which are produced by conflict with more formal

ties. The process is reminiscent of the interorganizational dialectics model

proposed by Zeitz (1980, p. 81-82).

Furthermore, the stronger the agreement on goals between two

organizations the higher the score of their relationship on the second pair of

variates and the lower the perceived effectiveness.  For these agencies, then, goal congruence hinders efficiency.  Consensus supports client flows but has an effect opposite to contractual ties and thus is inconsistent with the efficient accomplishment of more formal purposes.  The beneficial role of consensus as a component of governance structures of interorganizational relations should therefore be questioned.

Although both pairs of canonical variates influence perceived effectiveness significantly, only the first pair is related to the density of network substructures.  Thus, the structure of the network predicts only the congruence between the reasons dimensions, client referrals and planning, and the associated governance dimension, client dependence.

## DISCUSSION

The test of the hypotheses shows that both types of efficient relationship lead to perceptions of effectiveness. These results contribute concurrent validity to operationalizing optimality with population level coefficients. In addition, given a rough equivalence between perceived effectiveness and perceived equity in a relationship, the results support the assumption in transaction cost analysis that efficient governance structures create perceptions of equity for the parties involved.[8]

Moreover, the two measures of efficiency, represented by the pairs of canonical variates, are minimally confused. Only client flows, as a reason for relationship, has high weights on both measures. Except for client referrals, then, an agency can increase the efficiency of a relationship with another organization by expanding the range of reasons for the relationship and, with two exceptions, by increasing the extent to which governance characteristics regulate transactions. The exceptions are goal congruence, the effect of which has already been described, and, interestingly, service domain similarity. High service domain similarity leads to a lower score on the service contract governance dimension and therefore to lower efficiency, as measured by the second pair of variates. Agencies with relatively distinct service domains tend to have better governed financial transactions and perceive their relationships as more effective.

The way efficiency is defined in the present study may be generalizable to other contexts, notably interpersonal and inter-unit relationships within organizations. Since these types of relationship are inherently cooperative as well as competitive, the number of reasons for initiating and maintaining them may be large, as may be the corresponding set of governance characteristics. Defining relational efficiency as a multidimensional

construct, as was done in the present study, might be useful in clarifying some of the paradoxes of motivation and control in organizations with poor or non-existent internal price mechanisms (see March and Simon, 1958, Chapter 3).

Efficient transactions are not enacted, however, between isolated pairs of agencies. Location in the network significantly determines the efficiency of relationships based on clients and planning and governed by client dependence. The ecological metaphor is therefore useful for describing constraints non-profit organizations may face in establishing well-governed relationships of a certain type. In a sense, the community network structure defines in part the efficient boundaries of organizations (see Williamson, 1981; Ouchi and Barney, 1981) which govern their transactions in markets not regulated by a price mechanism. Correspondingly, efficiency mediates the relationship between network structure and perceptions of effectiveness, since position in the network does not affect perceived effectiveness directly (contrast Benson, 1975, p. 238).

Network location did not predict the efficiency of relationships established for mandatory or funding reasons, however, a result which may have been caused by several factors. First, organizations were chosen for the study on the basis of their involvement with mental health and mental retardation issues in a specific geographical region. Defining the network boundary in this way may have biased responses towards client - based relationships. Had the set of organizations been defined on a different basis, for example, commercial relationships, network structure might have been more strongly related to the efficiency of financially or legally motivated transactions.

Second, the network is composed of relationships in which agencies were directly involved over the previous six months. Direct involvement may

connote voluntary relationships. Client referrals and planning are generally thought of as discretionary activities; in fact, the canonical correlation results show a negative association between client flows and mandatory relationships. It follows that the network structure predicts the location of efficient relationships which can be freely entered into and dissolved but not the location of efficient relationships which have become formalized.

We applied ecological concepts to the cross-sectional relational structure of a bounded organizational community rather than examining changes in population of organizations over time (see Fennell, 1980; Nielsen and Hannan, 1977). Our approach took advantage of blockmodelling techniques to define ecological niches. Although we looked at only one population of interorganizational relationships (contrast Boje and Whetten, 1981), the interpretation of the relational data using the community ecology model seemes empirically justified. The concurrent validity of the niches which the the technique identified was assessed directly using the measures of relational efficiency. Since efficient relations contribute to organization performance, our definition of niche has implications for organizational survival, especially, in the community studied here, for the survival of agencies with strong client flow requirements.

By treating the community of organizations as both users and the environment to be used, we were consistent with the asymmetric nature of the data and with the consumer and habitat perspectives required for niche definition. However, deriving separate groupings of organizations as users and environment was a departure from most other studies of interorganizational networks based on the principal of structural equivalence (Burt, 1980a; Knoke and Rogers, 1978), and the technique went beyond other network studies (Van de Ven, Walker, and Liston, 1979) in refining the density matrix.

How should interorganizational relations be managed by non-profit agencies? When reasons for relationship are described in strategic terms (Boje and Whetten, 1981; Pennings, 1981), the efficiency coefficients produced by the canonical correlation analysis can be considered as both a strategy formulation and implementation schedule. From this point of view the results have normative implications for the agencies in the organizational community studied. The results specify how different strategic aspects of a relationship should be governed and how current governance structures might fit new strategies. Because the set of reasons dimensions, and likewise the governance dimensions, are orthogonal, the formulation and implementation of the components of an interorganizational strategy based on the results can be conceived and executed in relative independence, assuming that agencies can manage these components conceptually and operationally.

The composite of reasons and governance dimensions involving clients and planning, over which agencies might have the most discretion, is significantly related to the structure of the interorganizational network. Agencies attempting to reach out of their current set of partners should consider how the move might alter the network structure. Both niche consolidation and niche dissolution are possible effects. Therefore accurate information not only about the relationships between other organizations but also on the structure of the network is required for achieving efficient interorganizational outcomes. Agencies in a community must face the implications of making these kinds of information available (See Zeitz, 1980, p. 84).

Thus, the results also have implications for formulating policy at the community level. Whetten (1977) points out that policies for coordinating the activities of human service organizations can be either facilitative, following Warren's (1967) model, or coercive, in Hage's (1974) theory. These

alternative approaches may be more or less appropriate depending, in Whetten's contingency framework, on the context provided by a specific organizational community. The present research shows that effective relations between organizations can occur simultaneously in two independent ways, based on generally different reasons for relationship and managed by different governance mechanisms. Thus, the facilitative and coercive models may be pursued jointly, at least in the community of organizations studied here.

However, although both facilitative and coercive programs of interorganizational coordination may occur simultaneously, each has limitations. It is not clear how strongly the coercive model based on mandated, financial relations is tied to improving services. On the other hand, improving service delivery through the governance of client and planning relationships is constrained by the network structure.

In summary, interorganizational effectiveness is a function of how relationships instituted for different but perhaps associated reasons are governed; and which relationships are well governed depends in part on the pattern of interactions among all agencies. The research approach taken here can be generalized to other sets of organizations, units, or people whose relationships can be decomposed into motivations, governance characteristics, and evaluations. The network structure and efficiency coefficients of each set will generally, however, be unique, in keeping with the closed boundary respective of the ecology and optimality frameworks on which the present study was based. Our research can be considered a case study of a particular community of organizations; nevertheless, the results have substantive implications from which similar communities may gain.

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## FOOTNOTES

1)  For a description of internal and external governance mechanisms, see
    Ouchi and Barney, 1981.

2)  Coordination mechanisms, linking units <u>within</u> an organization and
    embodied in an orgnization's structure, have been cogently related to
    transaction efficiency (Williamson, 1975, Chapter 8).

3)  Commonly, transaction cost analysis has been contrasted to research on
    dependence relations on the grounds that efficiency is the principle
    underlying the development of different organizational forms, not
    power.  By including resource dependence as a governance characteristic
    we are blurring that contrast.  We do so for two reasons:  1) the
    distinction between efficiency and power is strongest when applied to
    the choice between internal and external forms of governance, and this
    choice is irrelevant to our concerns here; 2) perceived dependence may
    contribute to the efficiency of some transactions between non-profit
    orgazations when the autonomy of the organizations is not in question.

4)  It is not clear whether goal congruence is a condition for or outcome of
    the clan governance mechanism.  Here, because we have dimensionalized
    governance rather than chosen governance types, consensus is neither
    condition nor outcome, but an ingredient of efficient transactions in
    the appropriate situation.

5)  The primary difference between the approaches of community and
    population ecology (Hannan and Freeman, 1976) as they can be applied to
    the analysis of organizations is that the former focuses on the
    interactions among organizations while the latter is concerned with a
    population of organizations with similar attributes.  From the community
    perspective, organizations are separate species, grouped together
    because of their interrelationships.  The population view aggregates
    organizations into species according to characteristics which define
    their form (cf. McKelvey, 1978).

6)  Only 35% of the agency directors chose each other's agencies bilaterally
    in terms of direct involvement.  Asymmetry is thus a strong feature of
    the interorganizational network (compare the statement of Boorman and
    White, 1976, p. 1391, note 12, on this subject with regard to
    interpersonal networks).

7) As a way of measuring efficient relationships, canonical correlation can be seen as combination of the general congruence and compensatory models of fit (see Joyce, Slocum & Von Glinow, 1983). The weights are derived on the basis of maximized correlation between the sets of variables (general congruence) but the efficiency scores of each case are an additive composite of the weighted dimensions (compensatory). Furthermore, more than one measure of efficiency may be obtained using canonical correlation since more than one pair of weights can be produced.

8) Governance mechanisms should engender bilateral perceptions of equity, thereby leading to less costly future transactions, as the fear of opportunism is reduced. In the present study, however, we looked at relationships asymmetrically and consequently cannot say how well the governance structures derived predict perceptions of effective relations on both sides of a transaction.